

**SOUTHWEST RESEARCH INSTITUTE®**  
**SUMMARY STATUS FOR PROJECT NO. 14.06172**  
**AGREEMENT DTRS56-02-T-0003**

**“FEASIBILITY OF IN-LINE STRESS MEASUREMENT BY CONTINUOUS  
BARKHAUSEN METHOD”**

**STATUS OF WORK THROUGH SEPTEMBER 30, 2003**

This 18-month project relates to the problem of mechanical damage, hard spots, and other stress anomalies in a pipeline. Current in-line inspection (ILI) systems using magnetic flux leakage (MFL) or ultrasonic methods to inspect pipelines for corrosion or cracks are not sensitive to regions of anomalous stress on the pipe wall. The Continuous Barkhausen Noise (CBN) method, whose feasibility is being evaluated in this project, has been shown in earlier SwRI® work to detect such regions.

This project was designed to determine if CBN can be implemented on an existing MFL inspection pig by taking advantage of the fact that there are convenient transition regions in the magnetic flux around the pig. These transition regions are potential sensing areas for CBN. The project is studying the magnetic fields, designing CBN sensors, and testing them with pull-rig operation.

To date, Task 1: Determine Optimum Sensor Location, Task 2: Determine Optimum Sensor Design, and Task 3: Pull Rig Testing have been accomplished. Task 3 was completed in this quarter. Test specimens with two types of surface stress anomalies (peened and quenched) were deployed in a test line assembled at the H. Rosen facility in Houston. In a series of approximately a dozen pull runs, data were recorded from several configurations of CBN sensors plus the standard on-board MFL sensors. CBN data were fed from the pig to an instrument station outside the pipeline, where they were processed and recorded.

The next step in the development will be to outfit an H. Rosen MFL pig to acquire CBN data in an operating pipeline. That activity is contingent on the availability of Rosen hardware and personnel.

**Point of Contact**

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